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# FOREST STATISTICS FOR THE MOUNTAIN REGION OF NORTH CAROLINA, 1955

by

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U. S. DEPARTMENT OF AGRICULTURE

U. S. DEPARTMENT OF AGRICULTURE FOREST SERVICE

SOUTHEASTERN FOREST EXPERIMENT STATION

ASHEVILLE, NORTH CAROLINA

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In cooperation with the

NORTH CAROLINA

DEPARTMENT OF CONSERVATION AND DEVELOPMENT

DIVISION OF FORESTRY

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## FOREWORD

Through the McSweeney-McNary Act of 1928, Congress authorized the Secretary of Agriculture to conduct a comprehensive survey of the forest resources of the United States. The Forest Survey was organized by the Forest Service to carry out the provisions of the Act through the Regional Forest Experiment Stations. In the Southeastern states the Forest Survey is an activity of the Division of Forest Economics of the Southeastern Forest Experiment Station, Asheville, North Carolina.

The five-fold purpose of the Forest Survey is (1) to make a field inventory of the present supply of standing timber, (2) to ascertain the rate at which this supply is being increased through growth, (3) to determine the rate at which it is being reduced through industrial and domestic uses, fire, and other causes, (4) to determine the present consumption and the probable future trend in requirements for forest products, and (5) to interpret and correlate these findings to aid in the formulation of private and public policies regarding forest land management.

The forest resources of North Carolina were first inventoried by the Forest Survey during the years 1937-38. In 1952 a resurvey was started to determine the changes which have taken place since the first inventory, and to obtain up-to-date figures on forest area, timber volumes, growth, and timber cut. So far, field work has been completed in 3 out of 4 survey units and is continuing in the Piedmont area. This report presents resurvey statistics for the Mountain Region of North Carolina, which is known as Survey Unit No. 4.

## ACKNOWLEDGMENTS

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Forest survey work at the Southeastern Station is under the direction of James W. Cruikshank. Aerial photo interpretation was done by William H. B. Haines and mensurational work by Mackay B. Bryan. Field data were collected by L. C. Nix, John Vossden, Robert C. Gilmore, Edwin H. Manchester, William B. Buckley, and Clifford J. Purdy, Jr. Office compilation was under the supervision of Agnes O. Nichols, assisted by Louise Shuford, Sammy Wenningham, Eunice Gamble, and Gentile Young.

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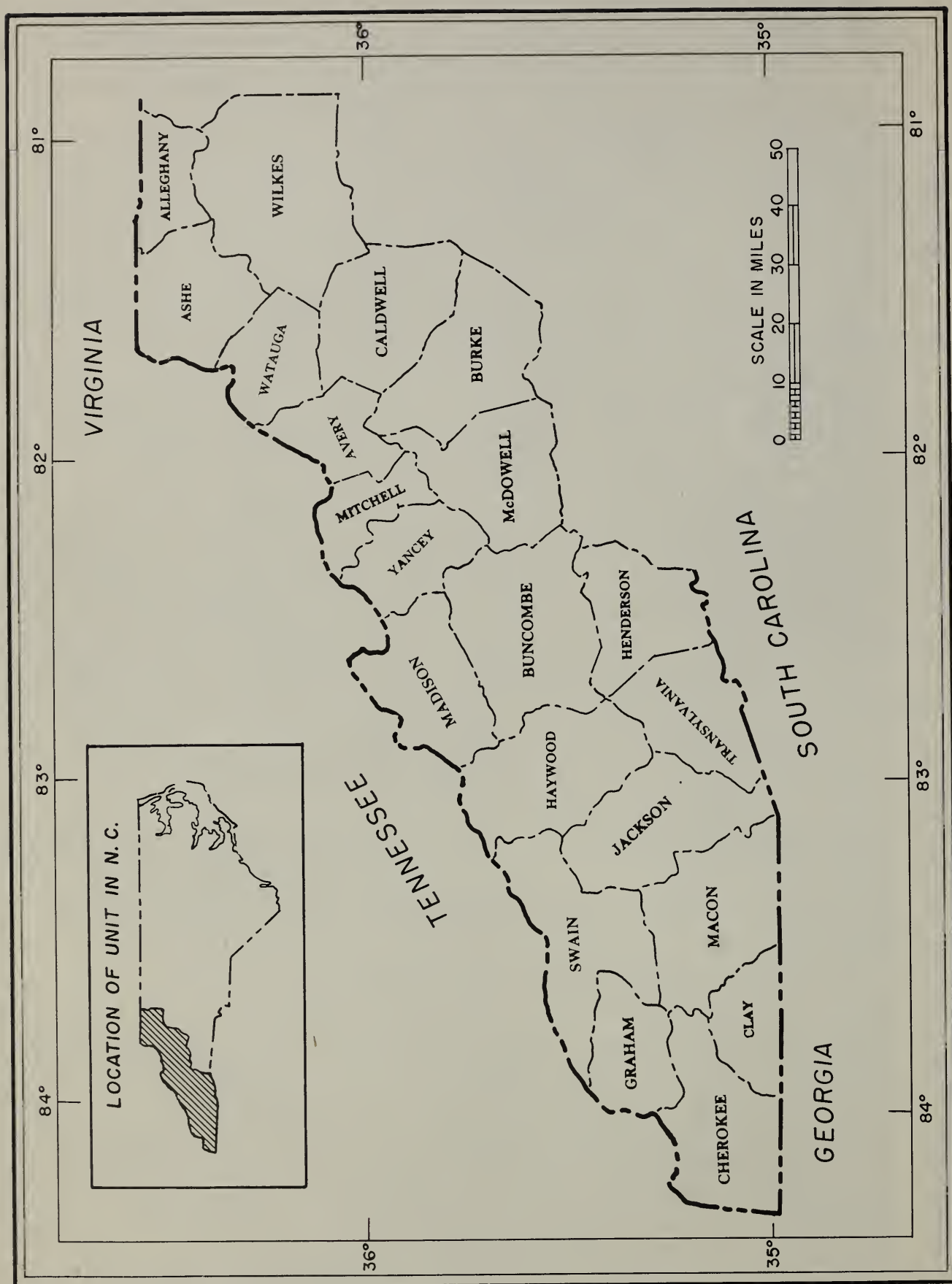


Figure 1.--Counties in the Mountain Region of North Carolina included in Forest Survey Unit No. 4.

## FOREST STATISTICS FOR THE MOUNTAIN REGION

### OF NORTH CAROLINA, 1955

The Mountain Region of North Carolina is located in a relatively narrow belt running along the western edge of the State. It is a 21-county area bounded on the east by the Piedmont and on the other sides by state lines of four adjoining southern states, as shown in figure 1. The steep, rugged terrain, together with marked differences in the type and composition of the forest cover, set this region apart from the rest of the State.

North Carolina's forest resources were originally inventoried by the Forest Survey during the years 1937-38. A new inventory of the State is now being made to obtain up-to-date information on forest area, timber volumes, growth, and the amount of timber cut. This progress report presents statistical data compiled from a resurvey of the Mountain Region started in March and completed in July 1955. Basic data were obtained from 1,450 one-fifth-acre forest sample plots distributed throughout all 21 counties. In addition, 300 nonforest plots were checked on the ground to increase the reliability of the forest area estimate. Procedures used in the Forest Survey are described briefly on page 46.

Timber stands which exist today are different in many respects from those which were found by the cruisers 17 years ago. The new inventory not only provides current facts on the forest resource, but it also presents an opportunity to determine the long-term trends which have had an effect in shaping the present-day stands. The changes discussed on the following pages all stem from a comparison of statistics for the two surveys. A careful adjustment of the 1938 survey data has been made to eliminate differences arising from definition or standards of measurement, so that valid comparisons could be made.

### HIGHLIGHTS AND TRENDS FOUND BY THE 1955 SURVEY

Four out of every five acres are forested.--The Mountain Region in Western North Carolina is the most heavily forested area in the State. Nearly 4.4 million acres were found to be under forest cover during the 1955 survey. This is 77 percent of the total land area in the Unit, making the ratio of forest to nonforest land nearly 4 acres to 1 (fig. 2). The proportion of forest land by county ranges from a low of 44 percent in Allegheny to a high of 94 percent in Swain County. It is highest in the western portion of the Unit, where 7 counties each have more than 80 percent of their land area in forest. Cropland, pasture, and other agricultural uses occupy most of the remaining acreage.

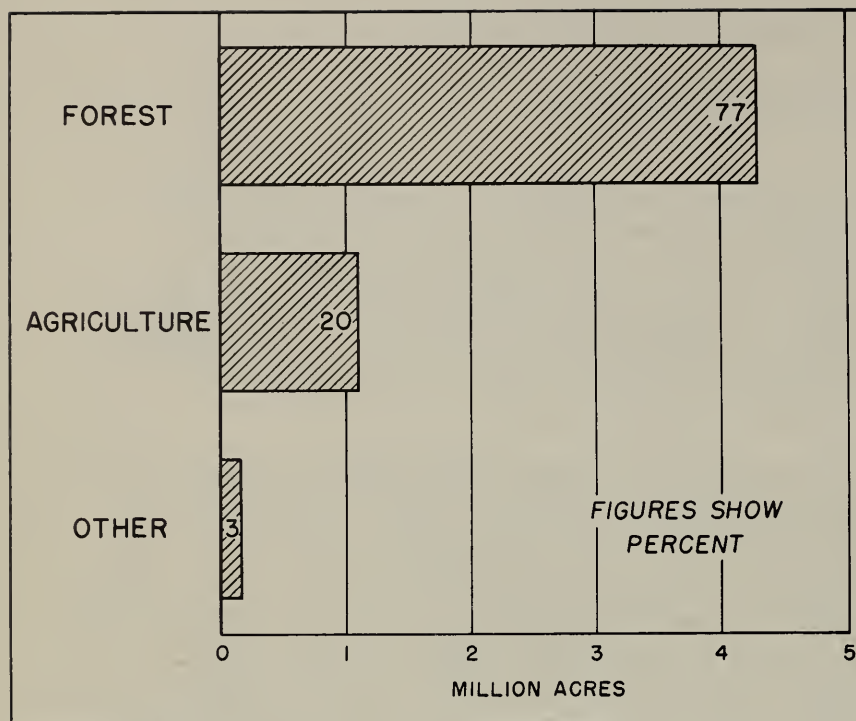


Figure 2.--Land use in the Mountain Region of North Carolina.

The present trend in land use is toward more forest and less agricultural land. Since 1938, the area supporting forests has been spreading as more and more abandoned fields and pastures were taken over by timber stands. The 1955 survey shows a 14-percent gain in forest area, which amounts to more than a half million acres. The trend is unit-wide, with each of the 21 counties showing a higher proportion of forest land now than they had 17 years ago.

Public agencies own 30 percent of the forest land.--Various Federal, State, and local government agencies own and administer 1.3 million acres of forest land in the mountain area (table A). The Pisgah and Nantahala National Forests contain over 900,000 acres of Federally-owned land, with boundaries extending into all but 2 of the 21 counties. The eastern portion of the Great Smoky Mountains National Park, located in Haywood and Swain Counties, contains 270,000 acres of rugged and isolated forest country. The National Park Service also owns about 28,000 acres of forest along the right-of-way of the Blue Ridge Parkway, a modern scenic highway built high up along the ridge of the mountain chain. The Qualla Reservation of the Cherokee Indians lies mostly in Swain and Jackson Counties and contains 53,000 acres of forest land. Much of the remaining public forest land is found in 20 municipal watersheds owned by cities and towns, the largest of which is the Asheville watershed, containing about 20,000 acres.

All the public forest land is not available for commercial timber production. There are 320,000 acres within the boundaries of parks, recreation areas, memorial forests, and municipal watersheds where



commercial cutting operations are not permitted. An additional 31,000 acres of rock outcrops, cliffs, and mountain balds were classed as noncommercial forest land because of poor site conditions.

Table A.--Land ownership, 1955

Ownership	Forest land area			
	Commercial	Noncommercial	Total	
	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Percent</u>
Public:				
National forests	890,600	19,800	910,400	20.9
Great Smoky Mts. N. P.	--	270,500	270,500	6.2
Blue Ridge Parkway	--	28,000	28,000	0.6
Indian	52,100	400	52,500	1.2
Other Federal	6,300	--	6,300	0.2
State	5,800	1,400	7,200	0.2
County & municipal	16,900	30,700	47,600	1.1
Total public	971,700	350,800	1,322,500	30.4
Private:				
Farm woodlands	2,288,600	6,900	2,295,500	52.7
Industrial & other	730,700	3,500	734,200	16.9
Total private	3,019,300	10,400	3,029,700	69.6
Total forest land	3,991,000	361,200	4,352,200	100.0

Approximately half of all the forest land in the Unit is in private farm woodlands, where the number of owners is large and the size of the average tract is small. An additional 17 percent is held by industrial or other private interests.

Forest types are principally hardwood.--Western North Carolina is a region of hardwood forests. Timber stands composed mainly of hardwood species are found on 3.2 million acres, or about 80 percent of the commercial forest area. The oak-hickory type is by far the most extensive. In this broad type classification, the most prevalent species are white oaks, red oaks, and hickory in association with yellow-poplar, basswood, and soft maple. Limited areas of the northern hardwood type including sugar maple, beech, and yellow birch, are found along the upper elevations. Stands of yellow pine, usually found on the lower slopes, make up about three-fourths of the softwood type area. Mixtures of white pine and hemlock are also important, and a small acreage of spruce and balsam fir is found on the tops of the higher mountains.

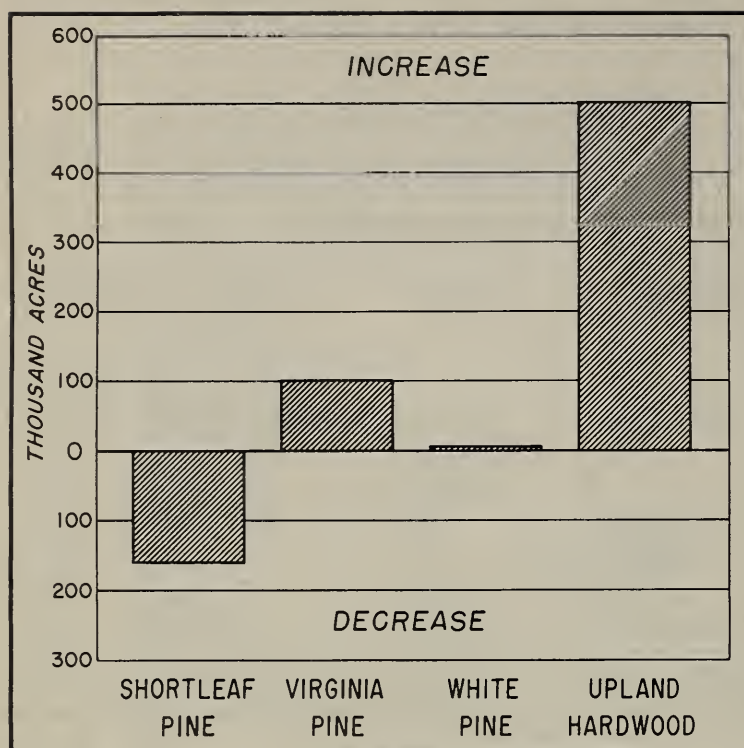


Figure 3.--Change in area of forest types, 1938 to 1955.

The area of hardwood forest types is increasing. Since 1938 they have gained a half million acres, indicating that a large proportion of the land which reverted to forest during the period became stocked with hardwood species (fig. 3). During the 17-year period, the areas in shortleaf and Virginia pine types have exhibited opposite trends with shortleaf decreasing and Virginia pine increasing. The net result has been a decrease of 60,000 acres in yellow-pine types, a loss of 7 percent. Mixtures of white pine and hemlock show only a slight increase in area.

Number of sound trees shows a substantial increase.--Comparisons of stand table data obtained from the 1938 and 1955 surveys show a rise of nearly 150 million in the number of sound trees one inch and larger in diameter, an increase of 13 percent. The number of trees of volume size, which range in diameter from 5.0 inches up, shows a gain of 118 million. Part of this increase is undoubtedly the result of increases in forest land area discussed earlier. However, it is obvious that timber cutting, fire protection, and other activities have influenced the development of present stands.

The upward trend is found in all species groups except yellow pines. Shortleaf, pitch, and Virginia pines comprise only one-eighth of the total stand, but they are much sought after for the production of lumber, pulpwood, and other forest products. A heavy rate of cutting has decreased the number of yellow pines in the larger, more valuable sizes, as shown in figure 4. The number of 10-inch trees is slightly higher, but the only important increase has been in the 6- and 8-inch pole trees. The smaller sapling-size trees also show a decrease, which may be an indication that hardwoods are hindering the reestablishment of young pines that will be vitally needed for the production of future timber crops.



White pine is the most important other softwood tree in the Mountain Region. It is also eagerly cut by loggers, but many of the trees are scattered throughout the hardwood stands, making the harvesting of this individual species more difficult. White pine grows rapidly and has been widely planted throughout the area in recent years. It also tends to reproduce itself and spread out under an effective program of forest fire control. The number of white pines has increased in all diameters up through 22 inches in size.

The largest gains are, of course, in the number of sound hardwoods. These species show a total increase of 125 million trees including a gain of 100 million trees in volume sizes. Most individual hardwood species have followed the same trend and now exist in greater numbers up to 22 or 24 inches in size. One of the reasons behind this change is the poor quality of much of the timber. Such species as scarlet and chestnut oaks are in good supply, but they produce lumber that is excessively knotty or brash. The heavy, dense wood found in hickory and black locust makes general use of these species for lumber or timbers impractical. The use of hardwoods for pulpwood is on the increase but is still of relatively minor importance. At the present time, there is obviously an oversupply of low-grade hardwoods which are creating problems in silviculture and utilization for this segment of the forest resource.

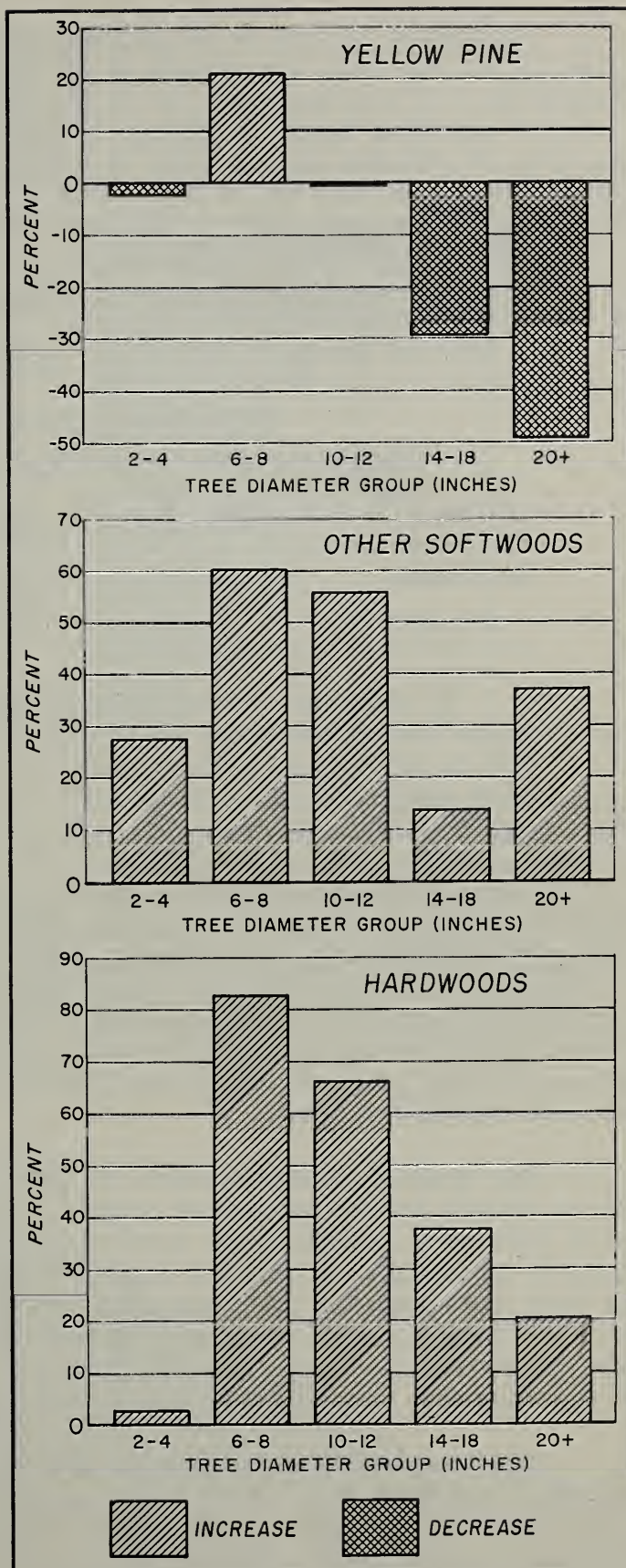


Figure 4.--Change in number of sound trees since 1938.

Sawtimber volume is 22 percent greater.--The volume of sawtimber material in the Unit now stands at 8.7 billion board feet. It has increased by 1.6 billion feet, or 22 percent, in 17 years (table B). As would be expected from the change in numbers of trees, the yellow pines are down 14 percent with a loss of 163 million feet. The other species groups show increases which are about equal in terms of percent, but the hardwood species account for nine-tenths of the over-all rise.

Table B.--Comparison of sawtimber volume, 1938 and 1955

Species group	1938 <sup>1/</sup>	1955	Change	
	<u>Million</u> <u>bd. ft.</u>	<u>Million</u> <u>bd. ft.</u>	<u>Million</u> <u>bd. ft.</u>	<u>Percent</u>
Yellow pines	1,154	991	-163	-14
Other softwoods	1,116	1,449	+333	+30
Hardwoods	4,835	6,236	+1,401	+29
All species	7,105	8,676	+1,571	+22

<sup>1/</sup> Original survey volumes have been recomputed to allow for differences in standards between the two surveys and to provide a uniform basis for comparison. Thus, the 1937 estimates shown here will not agree with the volumes previously published.

Along with the change by species group there has also been a shift in volume by tree-size class. Many of the larger trees have either been harvested and used, or lost through mortality from natural causes. The volume of soft-textured hardwoods (including the preferred yellow-poplar, basswood, and buckeye species) in trees 26 inches and larger has been cut in half. However, these losses have been more than compensated for by volume increases in the smaller hardwood sawtimber trees.

The gradual disappearance of blight-killed chestnut has also had an effect on the sawtimber supply. In 1938, about 800 million board feet were judged to be sufficiently sound for use as lumber, timbers, paneling, or extract wood. A great deal of this material has been salvaged and the remainder has deteriorated to a point where it is no longer considered as a source of raw material. A few of the remaining chestnut snags may still be cut for commercial use, but none of the chestnut was assigned board-foot volume in the 1955 survey.

The two national forests in the Region contain an estimated 2.8 billion board feet of sawtimber on 891 million acres of commercial forest land. These timber stands are heavier and more mature than the general run. They contain an average of 3,128 board feet per acre, as compared to 1,864 feet per acre found on private lands.



Species of oak predominate.--Nearly 3.5 billion board feet, or two-fifths of the sawtimber volume in the Unit, is made up of various species of oak. The red oaks constitute the largest group, with scarlet, northern red, and black oak as principal species (fig. 5). In the white oak group, chestnut oak trees contain two-thirds of the volume. Yellow-poplar and hickory are also important. The remaining hardwood sawtimber is made up of a large number of minor species including ash, beech, basswood, maple, birch, and locust. In the softwoods, both shortleaf pine and white pine each contain about three-fourths of a billion board feet. These species are followed in order by hemlock, Virginia pine, spruce, and balsam fir.

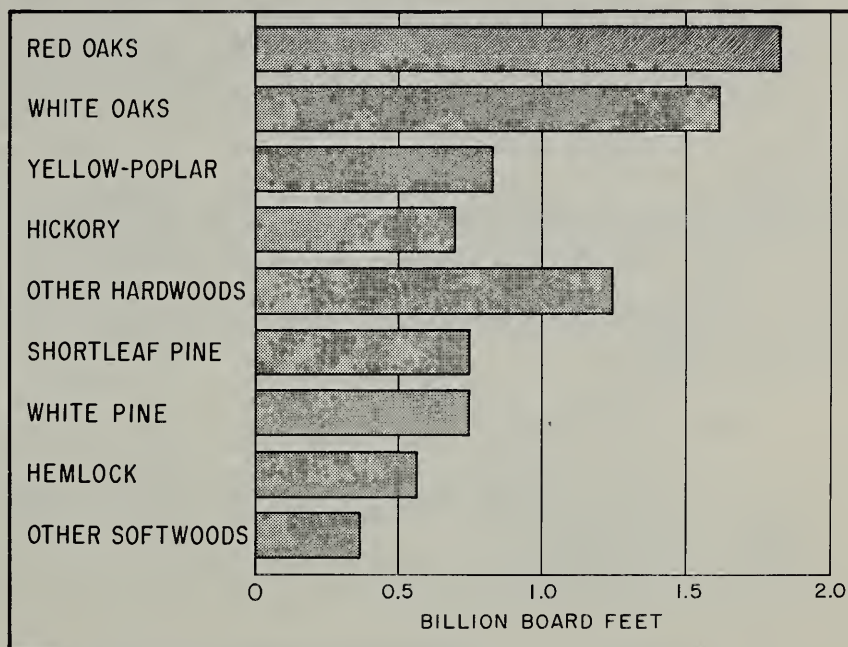


Figure 5.--Sawtimber volume by species.

Approximately 80 percent of the sawtimber volume is found in trees ranging from a minimum 9-inch diameter through 20 inches in size. Volumes are heaviest in the smaller diameter classes as indicated in figure 6. Hardwood species contain nearly three-fourths of the sawlog material and make up the bulk of the volume in all tree sizes. The yellow pines do not usually run much larger than 20 inches in diameter, but some of the white pines, hemlocks, and hardwood species range up to 40 inches and more in size.

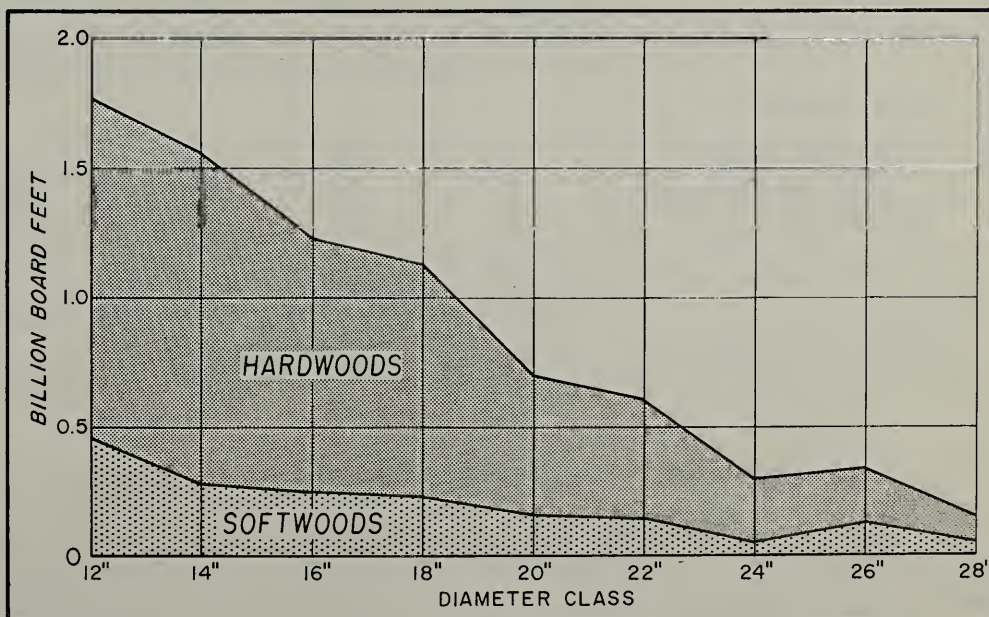


Figure 6.--Distribution of sawtimber volume by diameter class.

Growing stock volume is up 40 percent.--The level of growing stock volume shows a surprising rate of increase since 1938. The present estimate of 2.9 billion cubic feet is 40 percent greater than at the time of the original survey. Here again, hardwood species account for most of the gain, being up three-quarters of a billion feet. There was also a considerable increase in the amount of other softwood growing stock, but the yellow pines show no change in volume (table C). To make the difference between growing stock and sawtimber volume clear, the following description is given: Growing stock is a term which includes the volume of all sound pole trees, starting at 5.0 inches in diameter at breast height, as well as the larger sawtimber trees which start at 9 inches for softwoods and 11 inches for hardwoods. Volumes are customarily computed in terms of cubic feet of wood, excluding bark, or in terms of standard cords including wood plus bark. Growing stock does not include the volume of cull trees, or of trees smaller than 5.0 inches in size which, for inventory purposes, are assumed to have no volume.

Table C.--Comparison of volume in all trees 5.0 inches  
d.b.h. and larger, 1938 and 1955

Species group and class of material	1938 <sup>1/</sup>	1955	Change	
	<u>Million</u> <u>cu. ft.</u>	<u>Million</u> <u>cu. ft.</u>	<u>Million</u> <u>cu. ft.</u>	<u>Percent</u>
Growing stock:				
Yellow pines	384	384	0	0
Other softwoods	229	307	+78	+34
Hardwoods	1,477	2,228	+751	+51
All species	2,090	2,919	+829	+40
Cull trees:				
Yellow pines	49	104	+55	+112
Other softwoods	15	45	+30	+200
Hardwoods <sup>2/</sup>	555	864	+309	+56
All species	619	1,013	+394	+64
All live trees	2,709	3,932	+1,223	+45

<sup>1/</sup> See footnote 1, table B.

<sup>2/</sup> Excludes limb volume of hardwood sawtimber trees.

Table C shows that the amount of material in cull trees is also up sharply. A cull quality classification is assigned to a tree when it contains sufficient sound or rotten defect to make it



unmerchantable for saw logs either at the time of inventory, or at some future date when it will reach sawtimber size. Many of the cull trees can actually be used for such products as pulpwood, fence posts, and other items where clear length and straightness are not limiting factors.

The increase in both growing stock and cull trees has left the proportion of cull volume in the stands about the same. At the time of the first survey, 23 percent of the total volume in all live trees was classed as cull, while cull volume at present accounts for 26 percent.

Annual growth of sawtimber is 438 million board feet; of growing stock 2.4 million cords.--Western North Carolina forests are currently producing sawtimber at the rate of 438 million board feet per year. About half of this annual volume increase takes place on the oaks, hickories, and other hard-textured hardwood species which dominate the stands. Altogether, the hardwoods account for 320 million board feet, or approximately three-fourths of the total sawtimber growth.

The yearly increase in growing stock volume, including all sound trees 5.0 inches d.b.h. and larger, amounts to 155 million cubic feet of solid wood, or 2.4 million cords of wood and bark. Here again, the proportion of volume growth is about three-fourths hardwood and one-fourth softwood.

These timber growth estimates for the Mountain survey unit are based on the examination of increment cores taken from 2,400 sample trees scattered throughout all 21 counties. The cores were used to measure the rate of increase in tree diameter. They were also used to determine the number of young trees which are expected to reach volume size during the year, thus creating ingrowth. Sapling trees growing into pole size make up about 18 percent of the net growth on growing stock, and pole trees growing into sawtimber sizes account for 38 percent of the increase in board-foot volume.

Stands of white pine show the highest rate of production, with an average of 229 board feet, or 0.8 cord per acre per year. The average growth of timber stands, including all forest types and conditions in the unit, is 120 board feet, or 0.6 cord, per acre annually. This average is rather low, but it is heavily weighted by the slower-growing oaks and other hard hardwood species. In terms of total volume growth, the average annual rate of increase for all species is about 5 percent for sawtimber volume in board feet, and 6 percent for growing stock volume in standard cords.

Supply of hardwoods continues to increase.--In the 17-year period between 1938 and 1955, the volume of hardwood sawtimber increased 29 percent, while the supply of hardwood growing stock shows a gain of 51 percent. Comparisons of the current rate of growth with the amount

of timber cut indicate that this strong upward trend is still continuing (fig. 7). Logging operations, together with all other uses, are removing an average of 172 million board feet of hardwood sawtimber annually.

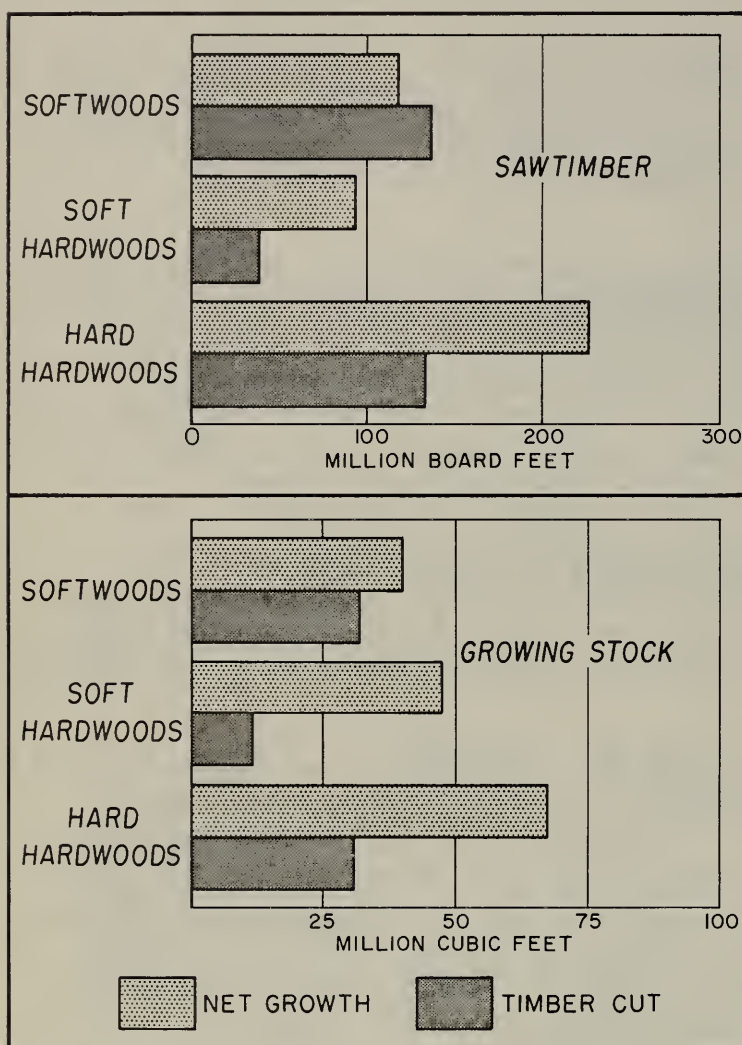


Figure 7.--Comparison of timber growth and timber cut in the Mountain Region of North Carolina.

This is only a little more than half the annual growth, leaving 147 million feet in the stands to increase the available supply. The annual gain in growing stock volume is even greater, with the volume cut amounting to 42 million cubic feet, or only 37 percent of the yearly growth.

The recent trend in the volume of softwood sawtimber is in the opposite direction. Harvesting activities for the removal of yellow pine, white pine, and hemlock have reached a level of 137 million board feet per year, which is 16 percent greater than the volume of growth for these species. The demand for white pine has been particularly heavy, with a good share of the output going into furniture manufacture. Yellow pine species are always preferred for the production of construction lumber and pulpwood bolts, and the requirements for these items have been increasing in recent years.

Cutting pressure on the softwood supply has been heaviest on the larger sawtimber-size trees. The volume of softwood growing stock, which includes the smaller pole trees, continues to follow the long-term trend by showing a surplus of growth over cut. This situation, where sawtimber is declining and growing stock is increasing, reflects the change in stand structure created by the effects of timber cutting and growth. Today's softwood timber stands are considerably younger, and they contain many more small trees and fewer large ones.



Table 1.--Gross area<sup>1/</sup> by broad use class, 1955

Class of use	Area	
	<u>Thousand acres</u>	<u>Percent</u>
Forest land:		
Commercial	3,991.0	69.9
Noncommercial:		
Productive-reserved	319.3	5.6
Unproductive	41.9	0.7
Total forest	4,352.2	76.2
Nonforest land:		
Agriculture	1,124.8	19.7
Urban and other <sup>2/</sup>	157.7	2.8
Total nonforest	1,282.5	22.5
Total land area	5,634.7	98.7
Total water area <sup>3/</sup>	74.1	1.3
All classes	5,708.8	100.0

<sup>1/</sup> From U. S. Bureau of the Census, 1950.

<sup>2/</sup> Includes urban, suburban residential, and rural industrial areas, rights-of-way, cemeteries, schools, etc.

<sup>3/</sup> Includes 45,400 acres of Census water reported in 1950 and 200 acres created since 1950, plus 28,500 acres of water in small streams and lakes which is defined by the Bureau of the Census as land area.

Table 2.--Ownership of commercial forest land, 1955

Class of ownership	Commercial forest land	
	<u>Thousand acres</u>	<u>Percent</u>
Public land:		
National forest	890.6	22.3
Indian	52.1	1.3
Other Federal	6.3	0.2
Total Federal	949.0	23.8
State	5.8	0.1
County and municipal	16.9	0.4
Total public	971.7	24.3
Private land:		
Farm	2,288.6	57.4
Other	730.7	18.3
Total private	3,019.3	75.7
All classes	3,991.0	100.0

Table 3.--Commercial forest area by forest type and stand-size class, 1955

(In thousand acres)

Forest type <sup>1/</sup>	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Seedling & sapling stands	Poorly stocked stands & unstocked areas	All stands
Softwood types:						
Shortleaf pine	34.2	106.4	130.0	39.1	--	309.7
Virginia pine	--	43.9	149.4	44.5	8.3	246.1
White pine	61.1	62.1	44.9	26.8	--	194.9
Spruce fir	5.1	--	5.6	--	3.5	14.2
Total	100.4	212.4	329.9	110.4	11.8	764.9
Hardwood types:						
Oak-pine	35.9	59.5	135.7	30.5	12.9	274.5
Maple-beech-birch	85.7	56.9	72.4	25.6	--	240.6
Oak-hickory	619.9	461.9	1,119.7	386.7	122.8	2,711.0
Total	741.5	578.3	1,327.8	442.8	135.7	3,226.1
All types	841.9	790.7	1,657.7	553.2	147.5	3,991.0
Percent	21.1	19.8	41.5	13.9	3.7	100.0

<sup>1/</sup> See description of forest types and stand-size classes under Definition of Terms.

Table 4.--Net volume<sup>1/</sup> of sawtimber by species and stand-size class, 1955

(In million board feet)

Species <sup>2/</sup>	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Seedling & sapling stands	Poorly stocked stands & unstocked areas	All stands
Softwoods:						
Shortleaf pine <sup>3/</sup>	163.9	425.8	119.7	41.2	2.4	753.0
Virginia pine	16.8	175.0	46.2	--	--	238.0
Total	180.7	600.8	165.9	41.2	2.4	991.0
White pine	402.0	267.1	54.9	22.0	--	746.0
Hemlock	488.9	25.6	15.9	40.0	--	570.4
Spruce and balsam fir	117.4	2.3	1.8	5.4	6.0	132.9
Total sftwds.	1,189.0	895.8	238.5	108.6	8.4	2,440.3
Hardwoods:						
Blackgum	65.1	34.5	35.1	1.9	--	136.6
Yellow-poplar	445.5	225.9	146.5	13.3	3.7	834.9
Soft maple	96.8	56.7	18.6	2.9	--	175.0
Basswood	153.8	29.2	37.8	--	--	220.8
Cucumber	30.5	1.0	3.8	2.5	--	37.8
Other soft hwdws.	68.0	22.8	16.2	1.5	--	108.5
Total	859.7	370.1	258.0	22.1	3.7	1,513.6
White oak	237.0	185.9	93.9	12.5	2.9	532.2
Chestnut oak	611.2	237.9	188.8	36.0	15.0	1,088.9
Northern red oak	533.5	142.1	88.5	9.6	5.3	779.0
Other red oaks	469.0	369.3	181.1	26.3	4.6	1,050.3
Hickory	412.0	156.9	109.0	14.9	6.6	699.4
Ash	30.3	11.0	18.2	--	--	59.5
Beech	56.3	34.6	25.1	--	--	116.0
Sugar maple	28.9	12.0	16.2	--	--	57.1
Yellow birch	38.9	3.0	2.5	4.0	--	48.4
Black walnut	13.6	11.8	6.7	1.8	4.0	37.9
Other hard hwdws.	123.8	59.7	61.6	4.3	4.1	253.5
Total	2,554.5	1,224.2	791.6	109.4	42.5	4,722.2
Total hwdws.	3,414.2	1,594.3	1,049.6	131.5	46.2	6,235.8
All species	4,603.2	2,490.1	1,288.1	240.1	54.6	8,676.1
Percent	53.1	28.7	14.8	2.8	0.6	100.0

<sup>1/</sup> Log scale, International 1/4-inch rule.<sup>2/</sup> See Definition of Terms for species combined with others.<sup>3/</sup> Includes pitch pine.



Table 5.--Net volume<sup>1/</sup> of sawtimber by species and diameter class, 1955

Species	10-12 inches <sup>2/</sup>	14-18 inches	20-24 inches	26+ inches	All diameters	
	<u>Million</u> <u>bd. ft.</u>	<u>Million</u> <u>bd. ft.</u>	<u>Million</u> <u>bd. ft.</u>	<u>Million</u> <u>bd. ft.</u>	<u>Million</u> <u>bd. ft.</u>	<u>Percent</u>
Softwoods:						
Shortleaf pine <sup>3/</sup>	448.2	270.3	34.5	--	753.0	8.7
Virginia pine	189.9	48.1	--	--	238.0	2.7
Total	638.1	318.4	34.5	--	991.0	11.4
White pine	239.0	270.3	161.2	75.5	746.0	8.6
Hemlock	44.7	113.2	143.0	269.5	570.4	6.6
Spruce and balsam fir	25.8	61.1	24.8	21.2	132.9	1.5
Total sftwds.	947.6	763.0	363.5	366.2	2,440.3	28.1
Hardwoods:						
Blackgum	33.5	73.0	30.1	--	136.6	1.6
Yellow-poplar	207.7	437.3	116.8	73.1	834.9	9.6
Soft maple	52.5	92.7	29.8	--	175.0	2.0
Basswood	40.7	128.1	46.1	5.9	220.8	2.6
Cucumber	6.5	31.3	--	--	37.8	0.4
Other soft hwdws.	30.9	62.9	14.7	--	108.5	1.3
Total	371.8	825.3	237.5	79.0	1,513.6	17.5
White oak	126.1	272.8	94.6	38.7	532.2	6.1
Chestnut oak	191.2	491.7	265.7	140.3	1,088.9	12.5
Northern red oak	87.3	316.5	224.6	150.6	779.0	9.0
Other red oaks	237.6	591.2	175.8	45.7	1,050.3	12.1
Hickory	136.1	341.0	173.3	49.0	699.4	8.1
Ash	12.7	45.2	1.6	--	59.5	0.7
Beech	40.5	55.8	19.7	--	116.0	1.3
Sugar maple	11.7	38.0	7.4	--	57.1	0.7
Yellow birch	7.7	20.7	10.7	9.3	48.4	0.6
Black walnut	4.2	30.2	3.5	--	37.9	0.4
Other hard hwdws.	83.7	131.4	38.4	--	253.5	2.9
Total	938.8	2,334.5	1,015.3	433.6	4,722.2	54.4
Total hwdws.	1,310.6	3,159.8	1,252.8	512.6	6,235.8	71.9
All species	2,258.2	3,922.8	1,616.3	878.8	8,676.1	100.0
Percent	26.0	45.2	18.7	10.1	100.0	--

<sup>1/</sup> Log scale, International 1/4-inch rule.

<sup>2/</sup> Ten-inch hardwoods are not included since they are below sawtimber size.

<sup>3/</sup> Includes pitch pine.

Table 6.--Net volume<sup>1/</sup> of sawtimber by forest type and stand-size class, 1955

(In million board feet)

Forest type	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Seedling & sapling stands	Poorly stocked stands & unstocked areas	All stands
Softwood types:						
Shortleaf pine	150.2	365.9	77.7	30.0	--	623.8
Virginia pine	--	185.3	60.6	5.8	--	251.7
White pine	610.0	210.2	36.1	0.7	--	857.0
Spruce-fir	117.4	--	1.9	--	6.0	125.3
Total	877.6	761.4	176.3	36.5	6.0	1,857.8
Hardwood types:						
Oak-pine	195.8	180.4	95.5	29.2	--	500.9
Maple-beech-birch	525.9	200.3	60.9	9.9	--	797.0
Oak-hickory	3,003.9	1,348.0	955.4	164.5	48.6	5,520.4
Total	3,725.6	1,728.7	1,111.8	203.6	48.6	6,818.3
All types	4,603.2	2,490.1	1,288.1	240.1	54.6	8,676.1
Percent	53.1	28.7	14.8	2.8	0.6	100.0

<sup>1/</sup> Log scale, International 1/4-inch rule.

Table 7.--Net volume of sawtimber by species group, log grade, and  
tree-size class, 1955

PINE

Log grade	10 - 14 inches <sup>1/</sup>		16+ inches		All trees	
	<u>Million</u> <u>bd. ft.</u>	<u>Percent</u>	<u>Million</u> <u>bd. ft.</u>	<u>Percent</u>	<u>Million</u> <u>bd. ft.</u>	<u>Percent</u>
Grade 1	--	--	--	--	--	(2/)
Grade 2	43.2	5.4	37.6	19.6	80.8	8.1
Grade 3	433.1	54.2	51.4	26.8	484.5	48.9
Grade 4	322.8	40.4	102.9	53.6	425.7	43.0
Total	799.1	100.0	191.9	100.0	991.0	100.0

OTHER SOFTWOODS

Grade 1	--	--	--	--	--	(2/)
Grade 2	6.5	1.5	397.5	39.1	404.0	27.9
Grade 3	309.3	71.5	371.1	36.5	680.4	46.9
Grade 4	116.8	27.0	248.1	24.4	364.9	25.2
Total	432.6	100.0	1,016.7	100.0	1,449.3	100.0

SOFT HARDWOODS

Grade 1	40.3	5.7	208.2	25.8	248.5	16.4
Grade 2	57.9	8.2	180.8	22.4	238.7	15.8
Grade 3	349.7	49.5	280.9	34.8	630.6	41.7
Grade 4	258.6	36.6	137.2	17.0	395.8	26.1
Total	706.5	100.0	807.1	100.0	1,513.6	100.0

HARD HARDWOODS

Grade 1	--	--	409.0	14.4	409.0	8.7
Grade 2	105.4	5.6	565.1	19.9	670.5	14.2
Grade 3	280.5	14.9	650.3	22.9	930.8	19.7
Grade 4	1,496.4	79.5	1,215.5	42.8	2,711.9	57.4
Total	1,882.3	100.0	2,839.9	100.0	4,722.2	100.0

<sup>1/</sup> Ten-inch hardwoods not included since they are below sawtimber size.

<sup>2/</sup> Insufficient sample.

Table 8.--Net volume<sup>1/</sup> of all timber by species and stand-size class, 1955

(In thousand cords)

GROWING STOCK						
Species	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Seedling & sapling stands	Poorly stocked stands & unstocked areas	All stands
Softwoods:						
Shortleaf pine <sup>2/</sup>	500	1,849	1,125	187	7	3,668
Virginia pine	88	829	1,060	4	--	1,981
Total	588	2,678	2,185	191	7	5,649
White pine	800	804	400	76	8	2,088
Hemlock	927	78	65	85	--	1,155
Spruce and balsam fir	255	6	35	13	15	324
Total sftwds.	2,570	3,566	2,685	365	30	9,216
Hardwoods:						
Blackgum	239	210	253	33	1	736
Yellow-poplar	1,445	1,161	1,781	80	10	4,477
Soft maple	501	376	578	19	--	1,474
Basswood	544	346	182	37	--	1,109
Cucumber	84	15	47	6	--	152
Other soft hwdws.	266	116	221	20	3	626
Total	3,079	2,224	3,062	195	14	8,574
White oak	793	845	930	41	7	2,616
Chestnut oak	2,073	1,124	1,407	115	52	4,771
Northern red oak	1,486	598	753	25	23	2,885
Other red oaks	1,482	1,813	1,989	102	38	5,424
Hickory	1,227	817	682	83	25	2,834
Ash	95	77	109	9	--	290
Beech	304	152	182	--	--	638
Sugar maple	125	121	126	10	--	382
Yellow birch	102	42	16	18	--	178
Black walnut	46	33	75	5	10	169
Dogwood, persimmon	22	28	36	--	--	86
Other hard hwdws.	668	436	897	24	17	2,042
Total	8,423	6,086	7,202	432	172	22,315
Total hwdws.	11,502	8,310	10,264	627	186	30,889
All species	14,072	11,876	12,949	992	216	40,105
Percent	35.1	29.6	32.3	2.5	0.5	100.0

## OTHER MATERIAL

Sound culls:						
Softwoods	278	277	913	443	41	1,952
Hardwoods	2,788	1,884	3,662	895	600	9,829
Rotten culls	596	374	606	184	81	1,841
Hardwood limbs	904	255	337	92	52	1,640
Total other material	4,566	2,790	5,518	1,614	774	15,262

<sup>1/</sup> Sound wood and bark.<sup>2/</sup> Includes pitch pine and redcedar.



Table 9.--Net volume<sup>1/</sup> of all timber by species and diameter class, 1955

(In thousand cords)

GROWING STOCK							
Species	Pole trees <sup>2/</sup>		Sawtimber trees				All diameters
	6 inches	8 inches	10 inches	12 inches	14-18 inches	20+ inches	
Softwoods:							
Shortleaf pine <sup>3/</sup>	744	799	774	651	631	69	3,668
Virginia pine	698	629	364	183	107	--	1,981
Total	1,442	1,428	1,138	834	738	69	5,649
White pine	322	237	333	268	522	406	2,088
Hemlock	55	47	47	73	232	701	1,155
Spruce and balsam fir	23	22	21	51	128	79	324
Total sftwds.	1,842	1,734	1,539	1,226	1,620	1,255	9,216
Hardwoods:							
Blackgum	107	184	60	111	204	70	736
Yellow-poplar	894	784	806	580	1,050	363	4,477
Soft maple	383	233	338	182	266	72	1,474
Basswood	129	181	241	123	327	108	1,109
Cucumber	12	--	43	19	78	--	152
Other soft hwdws.	127	139	75	90	162	33	626
Total	1,652	1,521	1,563	1,105	2,087	646	8,574
White oak	332	440	378	424	740	302	2,616
Chestnut oak	494	858	547	632	1,331	909	4,771
Northern red oak	253	282	395	278	851	826	2,885
Other red oaks	647	911	982	806	1,580	498	5,424
Hickory	357	307	362	433	883	492	2,834
Ash	37	78	18	38	116	3	290
Beech	88	130	75	139	160	46	638
Sugar maple	66	65	103	35	97	16	382
Yellow birch	24	18	15	25	52	44	178
Black walnut	16	7	41	14	83	8	169
Dogwood, persimmon	76	9	1	--	--	--	86
Other hard hwdws.	610	488	199	288	364	93	2,042
Total	3,000	3,593	3,116	3,112	6,257	3,237	22,315
Total hwdws.	4,652	5,114	4,679	4,217	8,344	3,883	30,889
All species	6,494	6,848	6,218	5,443	9,964	5,138	40,105
Percent	16.2	17.1	15.5	13.6	24.8	12.8	100.0

## OTHER MATERIAL

Sound culls:							
Softwoods	348	532	304	271	277	220	1,952
Hardwoods	1,529	1,356	1,572	1,170	2,309	1,893	9,829
Rotten culls	79	199	199	101	386	877	1,841
Hardwood limbs	--	--	--	--	681	959	1,640
Total other material	1,956	2,087	2,075	1,542	3,653	3,949	15,262

<sup>1/</sup> Sound wood and bark.<sup>2/</sup> Ten-inch hardwoods are classed as pole-size trees, whereas 10-inch softwoods are classed as sawtimber. This is indicated by the shaded line.<sup>3/</sup> Includes pitch pine and redcedar.

Table 10.--Net volume<sup>1/</sup> of all timber by species and class of material, 1955  
(In thousand cords)

Species	Growing stock				Other material	
	Sawtimber trees		Pole- timber trees	Total sound trees	Sound culls <sup>2/</sup>	Rotten culls
	Saw-log portion	Upper stems				
Softwoods:						
Shortleaf pine <sup>3/</sup>	1,701	424	1,543	3,668	764	7
Virginia pine	533	121	1,327	1,981	702	--
Total	2,234	545	2,870	5,649	1,466	7
White pine	1,298	231	559	2,088	234	20
Hemlock	876	177	102	1,155	213	1
Spruce and balsam fir	212	67	45	324	39	4
Total sftwds.	4,620	1,020	3,576	9,216	1,952	32
Hardwoods:						
Blackgum	309	76	351	736	320	88
Yellow-poplar	1,568	425	2,484	4,477	242	46
Soft maple	416	104	954	1,474	749	160
Basswood	442	116	551	1,109	182	55
Cucumber	76	21	55	152	58	20
Other soft hwdws.	225	60	341	626	241	99
Total	3,036	802	4,736	8,574	1,792	468
White oak	1,113	353	1,150	2,616	968	212
Chestnut oak	2,218	654	1,899	4,771	2,357	329
Northern red oak	1,564	391	930	2,885	955	120
Other red oaks	2,225	659	2,540	5,424	1,585	284
Hickory	1,448	360	1,026	2,834	498	135
Ash	124	33	133	290	61	12
Beech	272	73	293	638	441	95
Sugar maple	114	34	234	382	251	37
Yellow birch	95	26	57	178	123	52
Black walnut	77	28	64	169	62	1
Dogwood, persimmon	--	--	86	86	128	22
Scrub oak <sup>4/</sup>	--	--	--	--	578	18
Other hard hwdws.	579	166	1,297	2,042	1,361	333
Total	9,829	2,777	9,709	22,315	9,368	1,650
Total hwdws.	12,865	3,579	14,445	30,889	11,160	2,118
All species	17,485	4,599	18,021	40,105	13,112	2,150
Percent	43.6	11.5	44.9	100.0	85.9	14.1

<sup>1/</sup> Sound wood and bark.

<sup>2/</sup> Includes limb volume of hardwood sawtimber trees.

<sup>3/</sup> Includes pitch pine and redcedar.

<sup>4/</sup> Includes noncommercial species.

Table 11.--Net volume<sup>1/</sup> of all timber by forest type and stand-size class, 1955

(In thousand cords)

GROWING STOCK

Forest type	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Seedling & sapling stands	Poorly stocked stands & unstocked areas	All stands
Softwood types:						
Shortleaf pine	497	1,755	855	105	--	3,212
Virginia pine	--	1,003	1,254	36	8	2,301
White pine	1,258	776	417	7	--	2,458
Spruce-fir	257	--	34	--	15	306
Total	2,012	3,534	2,560	148	23	8,277
Hardwood types:						
Oak-pine	580	730	897	122	--	2,329
Maple-beech-birch	1,500	911	688	25	--	3,124
Oak-hickory	9,980	6,701	8,804	697	193	26,375
Total	12,060	8,342	10,389	844	193	31,828
All types	14,072	11,876	12,949	992	216	40,105
Percent	35.1	29.6	32.3	2.5	0.5	100.0

OTHER MATERIAL

Softwood types:						
Shortleaf pine	66	303	376	154	--	899
Virginia pine	--	87	575	88	26	776
White pine	374	137	139	53	--	703
Spruce-fir	10	--	34	--	15	59
Total	450	527	1,124	295	41	2,437
Hardwood types:						
Oak-pine	124	227	294	126	37	808
Maple-beech-birch	579	176	229	32	--	1,016
Oak-hickory	3,413	1,860	3,871	1,161	696	11,001
Total	4,116	2,263	4,394	1,319	733	12,825
All types	4,566	2,790	5,518	1,614	774	15,262
Percent	29.9	18.3	36.1	10.6	5.1	100.0

<sup>1/</sup> Sound wood and bark.



Table 12.--Net volume<sup>1/</sup> of all timber by species and diameter class, 1955

(In million cubic feet)

## GROWING STOCK

Species	Pole trees <sup>2/</sup>		Sawtimber trees				All diameters
	6 inches	8 inches	10 inches	12 inches	14-18 inches	20+ inches	
Softwoods:							
Shortleaf pine <sup>3/</sup>	36.4	55.2	57.4	48.5	50.2	5.7	253.4
Virginia pine	41.3	41.4	26.5	14.2	8.9	--	132.3
Total	77.7	96.6	83.9	62.7	59.1	5.7	385.7
White pine	21.4	17.8	26.0	22.9	45.9	38.4	172.4
Hemlock	3.6	3.5	3.8	6.1	20.8	67.6	105.4
Spruce and balsam fir	1.4	1.7	1.6	4.0	11.4	7.6	27.7
Total sftwds.	104.1	119.6	115.3	95.7	137.2	119.3	691.2
Hardwoods:							
Blackgum	6.3	12.1	4.4	8.8	16.3	5.7	53.6
Yellow-poplar	52.5	51.8	57.9	43.6	83.6	29.8	319.2
Soft maple	22.4	15.2	24.6	14.2	21.3	5.9	103.6
Basswood	7.4	11.9	17.3	9.2	25.8	9.0	80.6
Cucumber	0.6	--	3.1	1.5	6.3	--	11.5
Other soft hwdws.	7.5	9.0	5.4	6.9	13.1	2.8	44.7
Total	96.7	100.0	112.7	84.2	166.4	53.2	613.2
White oak	17.9	28.5	26.7	31.0	58.7	24.7	187.5
Chestnut oak	26.5	55.2	39.0	47.0	105.2	74.4	347.3
Northern red oak	13.9	17.8	27.8	21.5	67.3	68.2	216.5
Other red oaks	34.2	59.5	69.8	58.5	126.6	41.2	389.8
Hickory	20.8	19.6	25.6	33.0	70.8	40.1	209.9
Ash	2.2	5.2	1.3	2.8	9.3	0.3	21.1
Beech	5.2	8.3	5.5	11.0	12.7	3.8	46.5
Sugar maple	3.7	4.1	7.4	2.6	7.8	1.4	27.0
Yellow birch	1.5	1.0	1.0	1.7	4.2	3.6	13.0
Black walnut	0.9	0.4	2.9	1.0	6.4	0.7	12.3
Dogwood, persimmon	4.1	0.5	0.1	--	--	--	4.7
Other hard hwdws.	35.9	30.8	14.2	21.4	29.2	7.6	139.1
Total	166.8	230.9	221.3	231.5	498.2	266.0	1,614.7
Total hwdws.	263.5	330.9	334.0	315.7	664.6	319.2	2,227.9
All species	367.6	450.5	449.3	411.4	801.8	438.5	2,919.1
Percent	12.6	15.4	15.4	14.1	27.5	15.0	100.0

## OTHER MATERIAL

Sound culls							
Softwoods	20.8	36.6	23.6	21.1	23.3	20.5	145.9
Hardwoods	86.5	91.0	112.8	91.9	182.5	157.2	721.9
Rotten culls	6.2	13.6	14.2	7.5	30.9	73.0	145.4
Hardwood limbs	--	--	--	--	55.6	81.7	137.3
Total other material	113.5	141.2	150.6	120.5	292.3	332.4	1,150.5

<sup>1/</sup> Excluding bark.<sup>2/</sup> Ten-inch hardwoods are classed as pole-size trees, whereas 10-inch softwoods are classed as sawtimber. This is indicated by the shaded line.<sup>3/</sup> Includes pitch pine and redcedar.

Table 13.--Net volume<sup>1/</sup> of all timber by species and class of material, 1955  
(In million cubic feet)

Species	Growing stock				Other material	
	Sawtimber trees		Pole- timber trees	Total sound trees	Sound culls <sup>2/</sup>	Rotten culls
	Saw-log portion	Upper stems				
Softwoods:						
Shortleaf pine <sup>3/</sup>	134.3	27.5	91.6	253.4	54.8	0.5
Virginia pine	42.0	7.6	82.7	132.3	48.6	--
Total	176.3	35.1	174.3	385.7	103.4	0.5
White pine	118.4	14.8	39.2	172.4	19.8	1.9
Hemlock	80.7	17.6	7.1	105.4	19.3	0.1
Spruce and balsam fir	20.1	4.5	3.1	27.7	3.4	0.3
Total sftwds.	395.5	72.0	223.7	691.2	145.9	2.8
Hardwoods:						
Blackgum	24.7	6.1	22.8	53.6	23.6	7.5
Yellow-poplar	126.4	30.6	162.2	319.2	18.9	3.5
Soft maple	32.3	9.1	62.2	103.6	53.8	12.5
Basswood	35.7	8.3	36.6	80.6	14.2	4.7
Cucumber	6.2	1.6	3.7	11.5	4.3	1.3
Other soft hwdws.	17.6	5.2	21.9	44.7	17.6	7.9
Total	242.9	60.9	309.4	613.2	132.4	37.4
White oak	88.7	25.7	73.1	187.5	72.8	17.9
Chestnut oak	178.1	48.5	120.7	347.3	181.6	26.8
Northern red oak	125.0	32.0	59.5	216.5	75.3	9.6
Other red oaks	175.3	51.0	163.5	389.8	119.0	22.6
Hickory	114.9	29.0	66.0	209.9	39.3	11.1
Ash	9.9	2.5	8.7	21.1	4.2	0.8
Beech	21.3	6.2	19.0	46.5	32.0	7.9
Sugar maple	9.1	2.7	15.2	27.0	18.9	3.0
Yellow birch	7.6	1.9	3.5	13.0	9.4	4.3
Black walnut	6.3	1.8	4.2	12.3	4.8	0.1
Dogwood, persimmon	--	--	4.7	4.7	7.6	1.5
Scrub oak <sup>4/</sup>	--	--	--	--	39.6	1.7
Other hard hwdws.	44.9	13.3	80.9	139.1	95.3	24.9
Total	781.1	214.6	619.0	1,614.7	699.8	132.2
Total hwdws.	1,024.0	275.5	928.4	2,227.9	832.2	169.6
All species	1,419.5	347.5	1,152.1	2,919.1	978.1	172.4
Percent	48.6	11.9	39.5	100.0	85.0	15.0

<sup>1/</sup> Excluding bark.

<sup>2/</sup> Includes limb volume of hardwood sawtimber trees.

<sup>3/</sup> Includes pitch pine and redcedar.

<sup>4/</sup> Includes noncommercial species.

Table 14.--Average volume<sup>1/</sup> per acre of sawtimber by forest type,  
species group, and stand-size class, 1955

(In board feet)

Forest type and species group	Large sawtimber stands	Small sawtimber stands	Pole- timber stands	Other stand sizes	All stands
Shortleaf pine					
Softwood	3,381	2,954	554	717	1,712
Hardwood	1,005	487	43	50	303
Virginia pine					
Softwood	--	3,825	326	77	898
Hardwood	--	392	79	34	125
White pine					
Softwood	8,690	2,733	702	26	3,759
Hardwood	1,296	652	103	--	638
Oak-pine					
Softwood	2,283	1,337	278	267	767
Hardwood	3,184	1,697	425	406	1,057
Maple-beech-birch					
Softwood	2,904	1,671	88	231	1,480
Hardwood	3,231	1,852	754	155	1,832
Oak-hickory					
Softwood	152	150	36	119	98
Hardwood	4,694	2,768	818	299	1,939
All types					
Softwood	1,412	1,133	144	167	611
Hardwood	4,055	2,016	633	254	1,562

<sup>1/</sup> Log scale, International 1/4-inch rule.



Table 15.--Average volume<sup>1/</sup> per acre of all trees by forest type, species group, and stand-size class, 1955

(In standard cords)

Forest type and species group	Large sawtimber stands		Small sawtimber stands		Pole-timber stands		Other stand sizes		All stands	
	Sound <sup>2/</sup>	Cull <sup>3/</sup>	Sound	Cull	Sound	Cull	Sound	Cull	Sound	Cull
Shortleaf pine										
Softwood	9.3	0.4	12.8	1.3	5.5	1.5	1.9	2.6	8.0	1.5
Hardwood	5.2	1.5	3.7	1.5	1.1	1.3	0.7	1.3	2.4	1.4
Virginia pine										
Softwood	--	--	19.4	1.5	6.9	3.4	0.6	2.0	7.8	2.7
Hardwood	--	--	3.5	0.5	1.5	0.5	0.2	0.2	1.6	0.4
White pine										
Softwood	15.8	3.1	7.8	0.5	6.2	0.3	0.3	2.0	8.9	1.5
Hardwood	4.8	3.0	4.7	1.7	3.1	2.8	--	--	3.7	2.1
Oak-pine										
Softwood	6.1	--	4.8	0.3	2.1	0.3	1.2	2.1	3.1	0.5
Hardwood	10.0	3.5	7.5	3.6	4.5	1.9	1.6	1.6	5.4	2.4
Maple-beech-birch										
Softwood	6.0	0.8	6.1	0.2	1.5	--	0.6	0.5	4.1	0.4
Hardwood	11.5	6.0	9.9	2.8	8.0	3.2	0.4	0.7	8.9	3.8
Oak-hickory										
Softwood	0.5	(4/)	0.5	(4/)	0.2	0.1	0.4	0.2	0.4	0.1
Hardwood	15.6	5.5	14.0	4.0	7.7	3.3	1.4	3.4	9.4	3.9
All types										
Softwood	3.1	0.3	4.5	0.4	1.6	0.6	0.6	0.7	2.3	0.5
Hardwood	13.7	5.1	10.5	3.2	6.2	2.8	1.2	2.7	7.7	3.3

<sup>1/</sup> Sound wood and bark.

<sup>2/</sup> Sound trees.

<sup>3/</sup> Cull trees.

<sup>4/</sup> Less than 0.05 cord per acre.

Table 16.--Number of trees<sup>1/</sup> by species group, quality class, and tree size, 1955

(In thousand trees)

Species group and quality class	Sapling-size trees	Pole-size trees	Small sawtimber trees	Large sawtimber trees	All trees
Yellow pines:					
Sound trees	121,613	48,177	13,243	854	183,887
Sound culls	(2/)	15,319	4,028	197	19,544
Rotten culls	(2/)	--	29	19	48
Total	121,613	63,496	17,300	1,070	203,479
Other softwoods:					
Sound trees	58,692	15,861	6,125	2,313	82,991
Sound culls	(2/)	2,492	1,018	389	3,899
Rotten culls	(2/)	--	--	60	60
Total	58,692	18,353	7,143	2,762	86,950
Soft hardwoods:					
Sound trees	225,772	55,863	6,969	2,786	291,390
Sound culls	(2/)	16,660	2,058	1,027	19,745
Rotten culls	(2/)	2,407	819	1,097	4,323
Total	225,772	74,930	9,846	4,910	315,458
Hard hardwoods:					
Sound trees	540,208	141,645	24,557	11,821	718,231
Sound culls	(2/)	71,432	9,092	5,512	86,036
Rotten culls	(2/)	10,154	2,297	3,606	16,057
Total	540,208	223,231	35,946	20,939	820,324
All species	946,285	380,010	70,235	29,681	1,426,211

<sup>1/</sup> All trees 1.0 inch d.b.h. and larger.

<sup>2/</sup> Data not collected.

Table 17.--Area<sup>1/</sup> of seedling, sapling, and poorly stocked stands by  
plantability class, 1955

(In thousand acres)

Forest type	No planting required	Suitable for machine planting	Hand planting required	All classes
Shortleaf pine	39.1	--	--	39.1
Virginia pine	36.5	--	8.0	44.5
White pine	26.8	--	--	26.8
Spruce-fir	--	--	3.5	3.5
Oak-pine	34.7	--	--	34.7
Maple-beech-birch	14.3	--	5.3	19.6
Oak-hickory	386.9	13.0	57.1	457.0
All types	538.3	13.0	73.9	625.2
Percent	86.1	2.1	11.8	100.0

<sup>1/</sup> Excludes 75,500 acres on which planting would be impractical because of existing dense cover of brush.



Table 18.--Stocking on commercial forest area by forest type and  
tree-size class, 1955

(In thousand acres)

GROWING STOCK OF ALL SIZES

Forest type	Non- stocked 0-9%	Poor stocking 10-39%	Medium stocking 40-69%	Good stocking 70-100%	Total area
Shortleaf pine	--	60.9	89.1	159.7	309.7
Virginia pine	11.9	36.5	84.7	113.0	246.1
White pine	--	34.0	62.7	98.2	194.9
Spruce-fir	3.5	3.1	--	7.6	14.2
Oak-pine	10.1	49.1	95.9	119.4	274.5
Maple-beech-birch	6.0	37.4	83.1	114.1	240.6
Oak-hickory	105.8	610.7	981.1	1,013.4	2,711.0
All types	137.3	831.7	1,396.6	1,625.4	3,991.0
Percent	3.5	20.8	35.0	40.7	100.0

SAWTIMBER GROWING STOCK

Shortleaf pine	93.1	158.9	47.7	10.0	309.7
Virginia pine	158.7	61.1	16.1	10.2	246.1
White pine	52.7	83.3	42.9	16.0	194.9
Spruce-fir	6.7	2.4	--	5.1	14.2
Oak-pine	98.2	144.3	27.2	4.8	274.5
Maple-beech-birch	62.4	120.9	44.1	13.2	240.6
Oak-hickory	1,101.1	1,303.3	279.4	27.2	2,711.0
All types	1,572.9	1,874.2	457.4	86.5	3,991.0
Percent	39.4	46.9	11.5	2.2	100.0

Table 19.--Net annual growth by species group and unit of measure, 1955

Species group	Sawtimber	Growing stock	
	<u>Million bd. ft.</u>	<u>Million cu. ft.</u>	<u>Thousand cords</u>
So. yellow pines	54.0	23.3	384
Other softwoods	64.0	16.8	232
Soft hardwoods	93.3	47.4	741
Hard hardwoods	226.3	67.4	1,026
All species	437.6	154.9	2,383

Table 20.--Net annual growth percentages for each species group and unit of measure, 1955

Unit of measure	Southern yellow pines	Other softwoods	Soft hardwoods	Hard hardwoods	All species
Board feet	5.46	4.41	6.16	4.79	5.04
Cubic feet	6.06	5.50	7.73	4.17	5.31
Standard cords	6.82	6.47	8.64	4.60	5.94

Table 21.--Average growth of sawtimber per acre by forest type and stand-size class, 1955

(In board feet)

Forest type	Stand-size class			All stands
	Sawtimber	Poletimber	Other stands	
Shortleaf pine	212	74	18	130
Virginia pine	146	61	5	64
White pine	332	82	3	229
Oak-pine	195	74	23	108
Maple-beech-birch	248	67	20	170
Oak-hickory	203	67	17	112
All types	217	68	17	120

Table 22.--Average growth of growing stock per acre by forest type and stand-size class, 1955

(In standard cords)

Forest type	Stand-size class			All stands
	Sawtimber	Poletimber	Other stands	
Shortleaf pine	0.8	0.7	0.1	0.6
Virginia pine	0.9	0.8	0.1	0.6
White pine	0.8	1.2	(1/)	0.8
Oak-pine	0.6	0.5	0.2	0.5
Maple-beech-birch	0.8	0.6	(1/)	0.6
Oak-hickory	0.7	0.6	0.1	0.6
All types	0.8	0.6	0.1	0.6

(In cubic feet)

Shortleaf pine	55.7	40.5	6.8	43.1
Virginia pine	65.8	48.9	3.9	42.3
White pine	69.6	88.0	2.0	64.6
Oak-pine	45.3	29.5	13.1	32.4
Maple-beech-birch	59.9	40.8	3.1	48.1
Oak-hickory	55.4	40.8	9.6	40.7
All types	56.8	41.8	8.7	42.1

1/ Less than 0.05 cord per acre.



Table 23.--Average annual drain on sawtimber by tree-size class and  
species group

(In million board feet)

Tree-size class	Softwoods		Soft hardwoods	Hard hardwoods	All species
	Pine	Other			
Small sawtimber	41.0	20.1	13.0	43.8	117.9
Large sawtimber	5.7	69.8	25.8	89.8	191.1
All trees	46.7	89.9	38.8	133.6	309.0

Table 24.--Average annual drain on growing stock by tree-size class  
and species group

(In thousand cords)

Tree-size class	Softwoods		Soft hardwoods	Hard hardwoods	All species
	Pine	Other			
Pole trees	86	4	59	58	207
Small sawtimber	123	49	36	129	337
Large sawtimber	13	125	58	212	408
All trees	222	178	153	399	952

(In million cubic feet)

Pole trees	5.5	0.2	4.0	3.8	13.5
Small sawtimber	9.3	4.2	2.8	9.9	26.2
Large sawtimber	1.1	11.6	4.7	17.2	34.6
All trees	15.9	16.0	11.5	30.9	74.3

Table 25.--Net annual change in sawtimber volume by species group  
(In million board feet)

Item	Softwood species	Soft hardwoods	Hard hardwoods	All species
Net volume, Jan. 1	2,440.3	1,513.6	4,722.2	8,676.1
Total growth	141.9	101.0	255.1	498.0
Mortality	23.9	7.7	28.8	60.4
Net growth	118.0	93.3	226.3	437.6
Timber cut	136.6	38.8	133.6	309.0
Loss or gain	-18.6	+54.5	+92.7	+128.6
Net volume, Dec. 31	2,421.7	1,568.1	4,814.9	8,804.7
Percent change	-0.8	+3.6	+2.0	+1.5

Table 26.--Net annual change in growing stock by species group  
(In thousand cords)

Item	Softwood species	Soft hardwoods	Hard hardwoods	All species
Net volume, Jan. 1	9,216	8,574	22,315	40,105
Total growth	669	769	1,147	2,585
Mortality	53	28	121	202
Net growth	616	741	1,026	2,383
Timber cut	400	153	399	952
Loss or gain	+216	+588	+627	+1,431
Net volume, Dec. 31	9,432	9,162	22,942	41,536
Percent change	+2.3	+6.9	+2.8	+3.6

(In million cubic feet)

Net volume, Jan. 1	691.2	613.2	1,614.7	2,919.1
Total growth	44.6	49.5	76.1	170.2
Mortality	4.5	2.1	8.7	15.3
Net growth	40.1	47.4	67.4	154.9
Timber cut	31.9	11.5	30.9	74.3
Loss or gain	+8.2	+35.9	+36.5	+80.6
Net volume, Dec. 31	699.4	649.1	1,651.2	2,999.7
Percent change	+1.2	+5.9	+2.3	+ 2.8

Table 27.--County area by broad use class, 1955

County	Total area <sup>1</sup> /  Thousand acres	Nonforest area		Forest land		
		Land	Water	Non- commercial	Commercial	
	Thousand acres	Thousand acres	Thousand acres	Thousand acres	Thousand acres	Percent
Alleghany	147.2	81.7	0.5	4.0	61.0	41.6
Ashe	273.3	132.1	--	1.3	139.9	51.2
Avery	158.1	40.4	--	1.2	116.5	73.7
Buncombe	414.1	107.6	1.5	26.6	278.4	67.5
Burke	330.9	75.8	7.8	0.2	247.1	76.5
Caldwell	307.2	65.7	3.3	(2/)	238.2	78.4
Cherokee	298.9	32.4	10.8	1.9	253.8	88.1
Clay	140.1	16.3	3.8	2.5	117.5	86.2
Graham	191.4	14.1	9.3	4.1	163.9	90.0
Haywood	348.2	89.7	1.1	60.4	197.0	56.8
Henderson	244.4	67.9	0.4	(2/)	176.1	72.2
Jackson	319.3	40.7	3.5	4.5	270.6	85.7
McDowell	286.1	50.8	4.7	6.8	223.8	79.5
Macon	332.8	55.5	5.9	6.4	265.0	81.1
Madison	291.8	88.8	1.1	1.5	200.4	68.9
Mitchell	140.8	32.9	--	5.0	102.9	73.1
Swain	348.2	19.6	10.4	213.2	105.0	31.1
Transylvania	242.6	21.8	0.2	1.0	219.6	90.6
Watauga	204.8	89.7	8.2	10.9	96.0	48.8
Wilkes	489.6	106.6	1.1	4.9	377.0	77.2
Yancey	199.0	52.4	0.5	4.8	141.3	71.2
Unit total	5,708.8	1,282.5	74.1	361.2	3,991.0	70.8

<sup>1</sup>/ Gross area from Bureau of the Census, 1950.

<sup>2</sup>/ Less than 50 acres.



Table 28.--Ownership of commercial forest land by county, 1955

County	Private		Public						
			National forest	Indian	Other Federal	State	County, city, town	Total public	
	<u>Thousand acres</u>	<u>Percent</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Thousand acres</u>	<u>Percent</u>
Alleghany	61.0	100.0	--	--	--	--	(1/)	(1/)	--
Ashe	139.3	99.6	0.3	--	--	0.3	--	0.6	0.4
Avery	94.4	81.0	22.0	--	--	0.1	--	22.1	19.0
Buncombe	248.5	89.3	29.8	--	0.1	(1/)	(1/)	29.9	10.7
Burke	190.2	77.0	47.3	--	--	3.9	5.7	56.9	23.0
Caldwell	188.2	79.0	49.2	--	--	--	0.8	50.0	21.0
Cherokee	166.3	65.5	80.7	4.7	2.1	--	(1/)	87.5	34.5
Clay	57.1	48.6	57.8	--	2.6	--	--	60.4	51.4
Graham	60.3	36.8	101.4	1.7	0.5	--	--	103.6	63.2
Haywood	124.5	63.2	63.2	--	--	0.1	9.2	72.5	36.8
Henderson	156.9	89.1	18.2	--	--	0.9	0.1	19.2	10.9
Jackson	226.2	83.6	26.7	17.4	--	0.2	0.1	44.4	16.4
McDowell	164.0	73.3	59.3	--	--	(1/)	0.5	59.8	26.7
Macon	124.3	46.9	140.5	--	--	0.1	0.1	140.7	53.1
Madison	154.2	76.9	46.2	--	--	(1/)	(1/)	46.2	23.1
Mitchell	87.5	85.0	15.4	--	--	--	--	15.4	15.0
Swain	60.2	57.3	15.5	28.3	1.0	--	--	44.8	42.7
Transylvania	133.5	60.8	86.0	--	--	(1/)	0.1	86.1	39.2
Watauga	95.4	99.4	0.1	--	--	0.2	0.3	0.6	0.6
Wilkes	377.0	100.0	--	--	--	(1/)	--	(1/)	--
Yancey	110.3	78.1	31.0	--	--	(1/)	--	31.0	21.9
Unit total	3,019.3	75.7	890.6	52.1	6.3	5.8	16.9	971.7	24.3

1/ Less than 50 acres.

Table 29.--Net volume<sup>1/</sup> of sawtimber by county and species group, 1955  
(In million board feet)

County	Softwoods <sup>2/</sup>	Yellow-poplar and basswood <sup>3/</sup>	Oaks and other hard hardwoods	All species
Alleghany	41.2	20.0	58.1	119.3
Ashe	21.6	34.8	130.2	186.6
Avery	31.9	50.0	98.0	179.9
Buncombe	242.8	210.5	576.8	1,030.1
Burke	285.5	87.9	162.7	536.1
Caldwell	376.5	82.6	236.5	695.6
Cherokee	136.4	35.1	284.8	456.3
Clay	32.3	106.1	226.9	365.3
Graham	148.0	74.2	255.5	477.7
Haywood	36.5	72.6	221.1	330.2
Henderson	143.0	34.2	280.8	458.0
Jackson	84.7	109.5	318.7	512.9
McDowell	102.5	41.1	295.5	439.1
Macon	70.0	109.1	364.1	543.2
Madison	75.0	97.2	233.7	405.9
Mitchell	13.7	71.9	89.6	175.2
Swain	26.8	46.9	104.0	177.7
Transylvania	114.6	72.5	321.9	509.0
Watauga	87.3	18.8	44.8	150.9
Wilkes	202.5	91.9	206.4	500.8
Yancey	167.5	46.7	212.1	426.3
Unit total	2,440.3	1,513.6	4,722.2	8,676.1

<sup>1/</sup> Log scale, International 1/4-inch rule.

<sup>2/</sup> Includes pine, hemlock, spruce, and balsam fir.

<sup>3/</sup> Includes other soft hardwoods.

Table 30.--Net volume<sup>1/</sup> of sawtimber by county, broad species group,  
and diameter-class group, 1955

(In million board feet)

County	Softwoods			Hardwoods		
	9-14 inches	15-19 inches	20+ inches	11-14 inches	15-19 inches	20+ inches
Alleghany	13.8	13.2	14.2	33.8	26.9	17.4
Ashe	14.4	7.2	--	70.7	60.8	33.5
Avery	10.6	13.1	8.2	79.1	33.8	35.1
Buncombe	128.7	66.7	47.4	256.2	213.0	318.1
Burke	188.5	45.3	51.7	136.9	49.8	63.9
Caldwell	200.1	55.1	121.3	158.9	83.7	76.5
Cherokee	83.8	34.8	17.8	144.1	83.6	92.2
Clay	5.8	5.9	20.6	104.2	75.4	153.4
Graham	32.9	6.3	108.8	109.1	122.9	97.7
Haywood	15.0	15.7	5.8	104.7	103.2	85.8
Henderson	72.4	35.2	35.4	137.0	86.0	92.0
Jackson	5.8	35.0	43.9	206.3	129.9	92.0
McDowell	57.5	8.1	36.9	109.5	93.5	133.6
Macon	22.3	27.2	20.5	165.4	157.9	149.9
Madison	62.3	12.7	--	151.1	106.6	73.2
Mitchell	9.1	4.6	--	89.7	43.2	28.6
Swain	26.8	--	--	63.0	47.4	40.5
Transylvania	57.3	23.8	33.5	171.5	125.4	97.5
Watauga	12.5	6.4	68.4	32.4	23.8	7.4
Wilkes	175.0	18.7	8.8	157.7	102.7	37.9
Yancey	37.1	43.9	86.5	107.5	112.1	39.2
Unit total	1,231.7	478.9	729.7	2,588.8	1,881.6	1,765.4

<sup>1/</sup> Log scale, International 1/4-inch rule.



Table 31.--Net volume<sup>1/</sup> of all timber by county, pulping species group, and tree-diameter group,

1955

(In thousand cords)

## GROWING STOCK

County	Yellow pines		Other softwoods		Soft hardwoods		Hard hardwoods		All species
	5 - 12 inches	13+ inches	5 - 12 inches	13+ inches	5 - 12 inches	13+ inches	5 - 12 inches	13+ inches	
Alleghany	9	2	40	51	77	37	182	105	503
Ashe	--	--	57	26	146	63	343	274	909
Avery	--	--	37	49	282	92	486	194	1,140
Buncombe	520	115	67	191	501	397	1,326	1,231	4,348
Burke	963	94	163	157	325	121	730	287	2,840
Caldwell	759	137	267	323	403	124	693	479	3,185
Cherokee	556	71	58	73	190	67	1,048	518	2,581
Clay	14	11	11	45	117	196	518	479	1,391
Graham	70	15	51	196	170	147	421	533	1,603
Haywood	46	49	46	5	319	162	695	455	1,777
Henderson	160	67	82	108	152	56	639	561	1,825
Jackson	10	8	20	135	177	189	842	626	2,007
McDowell	271	58	5	64	222	77	700	608	2,005
Macon	169	38	32	73	524	184	639	778	2,437
Madison	140	32	141	36	408	176	563	458	1,954
Mitchell	--	--	23	9	314	114	354	167	981
Swain	110	6	21	--	64	102	212	192	707
Transylvania	132	35	72	94	260	141	762	648	2,144
Watauga	--	--	46	133	98	39	211	92	619
Wilkes	894	69	162	40	809	173	1,095	369	3,611
Yancey	--	--	117	260	283	76	362	440	1,538
Unit total	4,823	807	1,518	2,068	5,841	2,733	12,821	9,494	40,105

## OTHER MATERIAL

Alleghany	25	4	18	8	41	26	68	101	291
Ashe	46	4	14	27	36	24	241	167	559
Avery	2	--	--	3	35	27	88	165	320
Buncombe	10	--	1	1	56	49	231	322	670
Burke	61	5	10	34	57	30	106	185	488
Caldwell	200	22	2	--	57	25	245	198	749
Cherokee	9	--	--	--	20	29	119	172	349
Clay	--	--	--	1	11	19	50	137	218
Graham	52	10	--	6	51	102	185	558	964
Haywood	29	5	3	--	135	82	281	408	943
Henderson	76	27	9	21	33	57	310	255	788
Jackson	43	12	--	--	76	78	444	602	1,255
McDowell	90	23	4	--	65	104	402	401	1,089
Macon	64	5	9	30	55	103	418	580	1,264
Madison	112	6	11	30	66	62	305	298	890
Mitchell	--	--	--	--	42	28	82	108	260
Swain	22	3	--	--	16	30	78	111	260
Transylvania	56	27	--	--	73	112	402	493	1,163
Watauga	--	--	5	55	86	31	283	203	663
Wilkes	385	38	42	--	113	16	378	222	1,194
Yancey	--	--	47	120	42	60	321	295	885
Unit total	1,282	191	175	336	1,166	1,094	5,037	5,981	15,262

<sup>1/</sup> Sound wood and bark.

Table 32.--Average annual sawtimber drain by county and species group<sup>1/</sup>

(In million board feet)

County	Yellow pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species
Alleghany	0.3	1.9	0.8	2.7	5.7
Ashe	0.8	5.8	1.8	5.8	14.2
Avery	0.3	1.9	1.6	4.9	8.7
Buncombe	2.9	5.2	3.3	10.8	22.2
Burke	5.3	4.5	2.0	7.3	19.1
Caldwell	4.7	9.6	1.8	7.1	23.2
Cherokee	5.4	3.5	1.6	6.1	16.6
Clay	0.5	2.2	1.0	3.4	7.1
Graham	1.7	2.9	0.9	3.5	9.0
Haywood	1.3	4.8	2.0	6.5	14.6
Henderson	2.4	4.9	1.8	6.4	15.5
Jackson	1.6	5.6	3.3	10.7	21.2
McDowell	3.8	3.3	1.8	6.3	15.2
Macon	1.6	4.0	2.2	7.8	15.6
Madison	1.9	4.9	2.2	7.3	16.3
Mitchell	0.3	1.7	1.4	4.5	7.9
Swain	1.4	1.7	1.1	3.8	8.0
Transylvania	1.7	5.7	1.8	6.6	15.8
Watauga	0.4	3.2	1.3	4.2	9.1
Wilkes	8.0	7.5	3.6	12.9	32.0
Yancey	0.4	5.1	1.5	5.0	12.0
Unit total	46.7	89.9	38.8	133.6	309.0

<sup>1/</sup> Estimates of timber drain by county are less accurate than inventory volumes, and use of individual county statistics should be avoided. For general use, data for a minimum of 10 counties should be combined.

Table 33.--Average annual drain on growing stock by county and species group<sup>1/</sup>

(In thousand cords)

County	Yellow pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species
Alleghany	1	4	3	8	16
Ashe	4	11	7	17	39
Avery	2	4	6	14	26
Buncombe	14	10	12	32	68
Burke	25	9	7	22	63
Caldwell	21	19	7	21	68
Cherokee	23	7	7	20	57
Clay	3	5	4	10	22
Graham	7	6	5	11	29
Haywood	7	9	8	20	44
Henderson	12	10	7	19	48
Jackson	8	11	13	32	64
McDowell	17	7	7	19	50
Macon	8	8	10	23	49
Madison	9	10	8	22	49
Mitchell	2	3	6	13	24
Swain	7	3	4	11	25
Transylvania	9	11	8	20	48
Watauga	2	6	5	12	25
Wilkes	39	15	13	38	105
Yancey	2	10	6	15	33
Unit total	222	178	153	399	952

<sup>1/</sup> Estimates of timber drain by county are less accurate than inventory volumes, and use of individual county statistics should be avoided. For general use, data for a minimum of 10 counties should be combined.



## DEFINITION OF TERMS

### Land-Use Classes

Forest land: Includes (a) lands which are at least 10 percent stocked with trees of any size and capable of producing sawtimber or other wood products, and (b) lands from which the trees described in (a) have been removed to less than 10-percent stocking but which have not been developed for other use; subdivided into the following classes:

Commercial: Forest land which is (a) producing, or physically capable of producing, usable crops of wood (usually sawtimber), (b) economically available now or in the future, and (c) not withdrawn from timber use.

Noncommercial: Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order but which otherwise qualifies as commercial forest land, or (b) incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Nonforest land: Includes land under cultivation or in pasture where the timber has been cleared to less than 10 percent stocking, idle or abandoned agricultural land, marsh land, and land in urban, residential, or industrial areas, school yards, cemeteries, roads, railroads, and other rights-of-way.

Water: Includes lakes, bays, and estuaries over 40 acres in size, and streams, canals, and sloughs at least one-eighth of a mile in width which are classed as "inland water" by the Bureau of the Census. Smaller lakes and ponds between one acre and 40 acres in size, and waterways between 120 feet and 660 feet in width, which are classed as land area by the Bureau of the Census, are also included as water areas.

### Forest Types

Forest type is determined on the basis of cubic volume for all stand sizes except seedlings and saplings (stand size 4), in which case the number of stems are the criteria.

Yellow pine types: Forests in which 50 percent or more of the cubic volume or number of stems in the stand is shortleaf, pitch, or Virginia pine species. In mixtures the predominating species determines the type.

White pine and spruce-fir types: Forests in which 50 percent or more of the stand is eastern white pine and hemlock, either singly or in combination, or in which 50 percent or more is in spruce and balsam fir species.

Oak-pine type: Forests in which 50 percent or more of the stand is hardwoods, usually upland oaks, but in which southern yellow pine species make up 25 to 49 percent of the stand.

Maple-beech-birch type: Forests in which 50 percent or more of the stand is made up of hard maple, beech, or yellow birch, singly or in combination. Commonly associated species include white pine, hemlock, basswood, buckeye, and northern red oak.

Oak-hickory type: Upland hardwood forests in which 50 percent or more of the stand is composed of oak, hickory, yellow-poplar, soft maple, basswood, sweet birch, ash, and other hardwood species, except in cases where yellow pines made up 25 to 49 percent and the stand was classified as oak-pine type.

#### Stand-Size Classes

Sawtimber: Stands containing at least 1,500 board feet net volume per acre, International 1/4-inch log rule, in sound, live, softwood trees 9.0 inches d.b.h. or larger, or hardwood trees 11.0 inches d.b.h. or larger. Two classes of sawtimber stands are recognized:

Large sawtimber: Stands of sawtimber having more than 50 percent of the net board-foot volume in trees 15.0 inches d.b.h. or larger.

Small sawtimber: Stands of sawtimber having 50 percent or more of the net board-foot volume in trees smaller than 15.0 inches d.b.h.

Poletimber: Stands failing to meet the minimum sawtimber specifications, but at least 10-percent stocked with trees 5.0 inches d.b.h. or larger and with at least half the minimum stocking in pole-size trees.

Seedling and saplings: Stands not qualifying as sawtimber or poletimber stands, but having at least a 10-percent stocking of trees of commercial species and with half the minimum stocking in seedlings and saplings.

Nonstocked and other areas: Forest areas not qualifying as sawtimber, poletimber, or seedling and sapling stands.

#### Diameters

D.b.h. (diameter at breast height): Stem diameter in inches, outside bark, measured at 4-1/2 feet above the ground.

Diameter class: All trees were tallied by 2-inch diameter classes, each class including diameters 1.0 inch below and 0.9 inch above the stated midpoint, e.g., trees 7.0 to and including 8.9 inches are included in the 8-inch class. Corresponding limits apply to other diameter classes.

## Timber Quality Classification

### Growing Stock

Sawtimber trees: Live softwood trees at least 9.0 inches d.b.h. and hardwood trees at least 11.0 inches d.b.h., with not less than one merchantable log 12 feet long, or with less than 50 percent of the gross volume of the tree in sound sawtimber. To be merchantable all saw logs must be at least 8 feet long and at least 50 percent sound. They must also meet the following requirements:

Softwood logs<sup>1/</sup> must have a scaling diameter of 6 inches or larger, and sweep or crook must not exceed two-thirds of the scaling diameter.

Hardwood logs must have a scaling diameter of 8 inches or larger and must pass specifications<sup>2/</sup> for standard lumber logs, or tie and timber logs.

Poletimber trees: Straight-boled trees between 5.0 inches d.b.h. and sawtimber size.

Sapling-size trees: Trees 1.0 inch to 4.9 inches d.b.h. which will grow into poletimber or sawtimber-size trees of sound quality.

### Other Material

Sound cull trees: Live trees of all sizes that are unmerchantable for saw logs now or prospectively because of species, poor form, excessive limbiness, or other sound defect.

Rotten cull trees: Live trees of all sizes that are unmerchantable for saw logs now or prospectively because of rotten defect.

Hardwood limbs: The limb volume of all hardwood sawtimber and cull trees to a minimum diameter of 4.0 inches inside bark.

### Species Groups

Yellow pines: Includes shortleaf, pitch, Virginia, and Table-Mountain pine.

Other softwoods: White pine, hemlock, spruce, balsam fir, and eastern redcedar.

Soft hardwoods: Blackgum, yellow-poplar, soft maple, basswood, sycamore, cucumber, and buckeye.

Hard hardwoods: All of the oaks, hickories, ash, beech, birch, hard maple, black locust, black walnut, holly, dogwood, persimmon, and sourwood.

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<sup>1/</sup> For detailed specifications of log grades, see "Interim log grades for southern pine." Southern Forest Experiment Station, 18 pp. 1953.

<sup>2/</sup> For detailed hardwood log grade specifications, see "Hardwood log grades for standard lumber: proposals and results." U. S. Forest Products Laboratory, D1737. 1949.



## Volume Estimates

Board-foot volume: The volume in board feet, measured by the International 1/4-inch rule, exclusive of defect, of that portion of sound sawtimber trees between the stump and the upper limit of merchantability for saw logs.

Volume in cords: For sound trees the volume in standard cords (including bark) of the sound portion of trees 5.0 inches d.b.h. and larger, between stump and a minimum top-stem diameter of 4.0 inches inside bark. Similar volumes are given for cull trees. The volume in limbs, which are at least 4.0 inches in diameter inside bark, is shown separately for all sawtimber-size hardwoods.

Volume in cubic feet: Same as volume shown in cords except bark is not included.

International 1/4-inch log rule: A rule for estimating the board-foot volume of 4-foot log sections, according to the formula  $V = .905 (0.22D^2 - 0.71D)$ . The taper allowance for computing the volume in log lengths greater than four feet is 0.5 inch per 4-foot section. Allowance for saw kerf is 1/4 inch.

Standard cord: A stacked pile, 4 x 4 x 8 feet, of round or split bolts, estimated to contain, on the average, about 74 cubic feet of solid wood.

## Growth and Timber Cut

Net growth.--The estimated volume of net growth includes the growth on the present growing stock, the growth on trees which died or were cut during the year, and the ingrowth resulting from smaller trees reaching volume size. It excludes mortality, or loss of volume in trees dying from natural causes. Net growth estimates are based on growth of sound trees. Growth of "other material" is not included.

In board feet: The change during the calendar year in sawtimber volume resulting from growth, ingrowth, and mortality losses.

In cubic feet or cords: The change during the calendar year in the volume of all sound trees 5.0 inches and larger resulting from growth, ingrowth, and mortality losses.

Timber cut.--The volume of timber cut is based on the measurement and tally of stumps found on regular ground sample plots. Stumps of all trees cut during the past 3-year period are recorded and the measurements are converted into equivalent tree volume. The average yearly volume of timber cut for the 3-year period is then taken as the annual estimate. Board-foot volumes include the saw-log portion of all sawtimber-size trees which were cut. Estimates in cubic feet or cords include the entire stem from stump to 4.0-inch top of all sound trees 5.0 inches in diameter and larger. Timber cut from cull or dead trees is not included.

## Stocking

Stocking is the extent to which growing space is effectively utilized by trees. The number of stems present by d.b.h. classes was used as a basis for stocking classification. Areas having the minimum numbers of trees listed below, either in a single diameter class or proportionately in any combinations of diameter classes, were considered fully stocked.

<u>D.b.h.</u>	<u>Minimum number trees per acre</u>
Seedlings	1,000
2 inches	800
4 inches	590
6 inches	400
8 inches	240
10 inches	155
12 inches	115
14 inches	90

## RELIABILITY OF FOREST SURVEY DATA

In general, the errors which affect the accuracy of Forest Survey area and timber volume estimates arise from two sources. These may be described as (1) sampling errors which result from using sampling procedures rather than making a complete inventory or canvass, and (2) non-sampling errors which arise from human mistakes in judgment, measurement, recording, or arithmetic.

In Forest Survey work a diligent effort is made to maintain a high degree of accuracy in the collection and compilation of data. The sampling errors are held to a specified minimum through survey design and sampling technique. These errors are the only measurable errors involved in computing the reliability of the data. The non-sampling errors are minimized or eliminated through training, supervision, field check cruises, and complete editing and machine verification in compiling the data.

Forest area.--The sampling intensity of the 1955 survey provided an estimate of the total forest area with a standard error of  $\pm 0.6$  percent. The probabilities are two out of three that the actual forest area is within  $\pm 0.6$  percent of the estimated acreage. The standard error per million acres was  $\pm 1.3$  percent.

Cubic volume.--The standard error of the net cubic-foot volume estimate was  $\pm 2.6$  percent, or  $\pm 4.4$  percent per billion cubic feet. Here again, the probabilities are two out of three that the actual volume does not vary from the estimated volume by more than this percentage. The error of the volume in standard cords was not computed, but it should be approximately the same as for cubic volume.

Board-foot volume.--The standard error of the total board-foot volume estimate was  $\pm 3.6$  percent.

Growth.--Estimates of timber growth are based on measurements of radial growth in sample trees, and on mortality data taken on sample plots. Because of technical problems involved, no attempt was made to compute the sampling error of growth estimates.

Timber cut.--Estimates of the amount of timber cut were based on the number and size of stumps tallied on cutover plots. Stumps of all trees cut during the 3-year period preceding date of inventory were recorded, and the measurements were converted into tree volume. The average volume of timber cut for the 3-year period was taken as the annual estimate. The standard error for the total volume of growing stock cut was  $\pm 11.2$  percent, or  $\pm 3.0$  percent per billion cubic feet.

Use of county data.--The tables showing forest area, timber volumes, and timber cut by county are included to permit grouping of the data in any desired area combinations. In designing the survey, provision was made for controlling the range of sampling error on a county basis. However, comparison or use of individual county statistics should be avoided because of the possibility that they may be subject to considerable error. It is recommended that area or volume data for a minimum of five counties be combined, and that at least 10 counties be used when working with data on timber cut.

The actual range of errors on county data are shown below:

<u>Item</u>	<u>Percent of error</u>	
	<u>Low</u>	<u>High</u>
Forest area	$\pm 1.5$	$\pm 7.1$
Growing stock volume	$\pm 6.2$	$\pm 15.6$
Board-foot volume	$\pm 8.0$	$\pm 20.8$



## HOW THE FOREST INVENTORY IS MADE

The present system of inventory is a two-step method which includes land-use classification of points on aerial photographs followed by the cruising of ground sample plots. The county is the basic work unit. The detailed procedure is as follows:



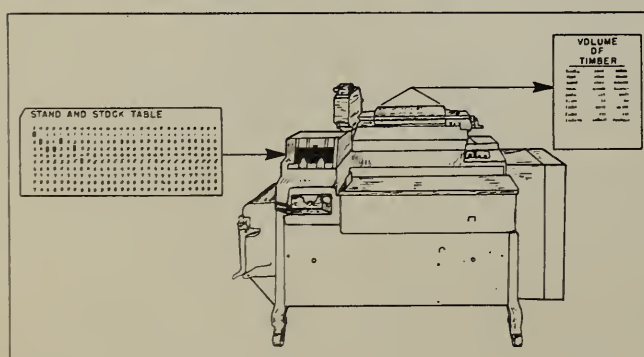
1. Preliminary estimates of the acreage of land in forests and other land-use classes are obtained by classifying points printed on every third aerial photograph in alternate flight lines within a county. The proportion of points falling in each class is used to estimate the acreage. This estimate is later checked and revised through the use of ground plots.



2. Ground sample plots are selected in a systematic manner from the forest land classifications made in Step 1, using an interval which will provide sufficient plots to meet established limits of error per billion cubic feet of timber. This results in a proportional sample of all existing timber stands. Timber cruisers make a detailed description and tally of the ground plots to obtain data on timber volume, quality, stocking, and mortality. Samples of agricultural and other photo classifications are also checked on the ground to verify or adjust the area estimates based on these classifications.



3. Growth estimates are based on increment borings taken proportionally from sample trees of various diameters and species in each forest type and stand class. The volume of timber cut is computed from a tally of the stumps of trees cut on the plots during a specified period.



4. All field data are sent to Asheville for editing and are placed on punch cards for machine sorting and tabulation. Final estimates are based on statistical summaries of the data.

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P. O. Box 2570, Asheville, N. C.

Forest Survey Reports Published Since 1945

Forest Statistics:

- No. 25 - Forest Resources of the Lower Coastal Plain of South Carolina
- No. 26 - 1946 Commodity Drain by County from South Carolina Forests
- No. 28 - South Carolina's Forest Resources, 1947
- No. 30 - Forest Resources of Northeast Florida, 1949
- No. 31 - Forest Resources of Central Florida, 1949
- No. 32 - Forest Resources of Northwest Florida, 1949
- No. 33 - Forest Resources of South Florida, 1949
- No. 34 - Timber Production and Commodity Drain from Florida's Forests, 1948
- No. 36 - Forest Statistics for Florida, 1949
- No. 37 - Forest Statistics for Southwest Georgia, 1951
- No. 39 - Forest Statistics for Southeast Georgia, 1952
- No. 40 - Forest Statistics for Central Georgia, 1952
- No. 41 - Forest Statistics for the Southern Coastal Plain of North Carolina, 1952
- No. 42 - Forest Statistics for North Central and North Georgia, 1953
- No. 44 - Forest Statistics for Georgia, 1951-53
- No. 45 - Forest Statistics for the Northern Coastal Plain of North Carolina, 1955

Pulpwood Production:

- No. 21 - 1945 Pulpwood Production by County in the Carolinas and Virginia
- No. 23 - 1946 Pulpwood Production by County in the Southeast
- No. 27 - 1947 Pulpwood Production by County in the Southeast
- No. 29 - 1948 Pulpwood Production by County in the Southeast
- \*No. 35 - 1949 Pulpwood Production in the South (out of print)
- \*No. 69 - Pulpwood Production in the South, 1950
- \*No. 35 - 1951 Pulpwood Production in the South
- \*No. 72 - 1952 Pulpwood Production in the South
- \*No. 43 - 1953 Pulpwood Production in the South
- \*No. 76 - 1954 Pulpwood Production in the South

Other Reports

- Southern Forests as a Source of Pulpwood. Forest Survey Release No. 22
- Southern Pulpwood Production and the Timber Supply. Forest Survey Release No. 24
- Virginia Forest Resources and Industries, 1949. U. S. Dept. Agr. Misc. Pub. No. 661
- The Timber Supply Outlook in South Carolina, 1951. U. S. Dept. Agr. Resource Report No. 3
- The Timber Supply Situation in Florida, 1952. U. S. Dept. Agr. Resource Report No. 6

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